

Carbon Foam Self-Heated Tooling for Out-of-Autoclave Composites Manufacturing, Phase I

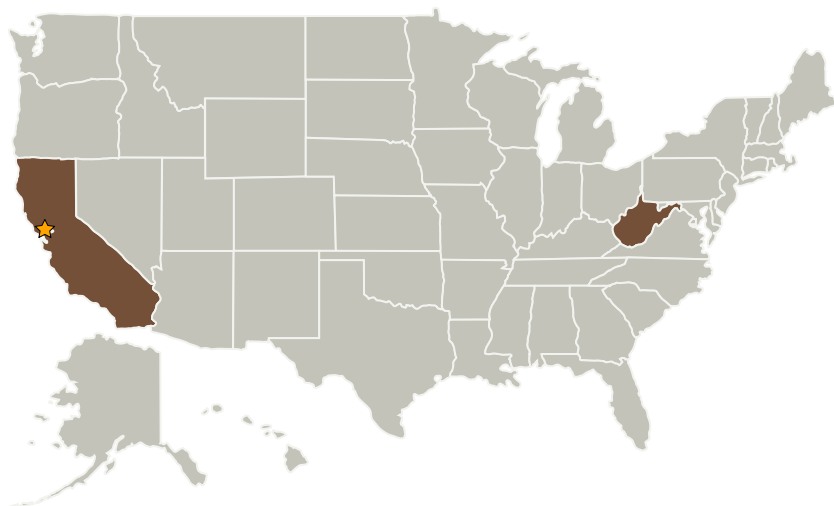
Completed Technology Project (2009 - 2009)



Project Introduction

This proposal addresses NASA's need for non-autoclave composites manufacture. The Constellation program, including the Ares V launch vehicle, will require very large-scale structures and conventional autoclave-based composites which are very costly and suffer from logistical problems. Out of autoclave (OOA) composite manufacturing technology has the potential to solve the constraint issues of autoclave processes without suffering performance issues. However, several critical issues remain a technical challenge, and further development is required to bring OOA into the mainstream of composites manufacturing. Touchstone proposes to demonstrate that a composite tool made from its carbon foam materials can be self-heated by passing an electric current through the tool body, thereby heating only the tool and part and not requiring an autoclave or oven for curing. In Phase 1, a small prototype tool will be built and tested for self-heating performance in comparison to a conventional autoclave cure cycle on the same tool. Specific resin systems suited for OOA processing will be utilized, and performance properties of composite samples produced by both the self-heated carbon foam tool and a conventional carbon foam autoclave tool will be characterized. At the end of Phase 1, the TRL will be 4, and by the conclusion of Phase 2, the TRL will reach 6.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Touchstone Research Laboratory, Ltd.	Supporting Organization	Industry	Triadelphia, West Virginia

Primary U.S. Work Locations

California	West Virginia
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.4 Manufacturing
 - └ TX12.4.1 Manufacturing Processes